

REMARKS

In response to the Final Office Action dated July 10, 2007, claim 1 is amended and claims 15-19 are new. Claim 7 is cancelled without prejudice. Claims 8-14 were withdrawn (not elected) on April 13, 2007, in response to the restriction requirement mailed March 16, 2007. Claims 1-6 of species I were elected. Please note that new claims 16-19 correspond to withdrawn claims 8-11. Withdrawn claims 8-11 also belong to Species I according to page 2 of the restriction requirement, and claims 8-11 were erroneously not elected. However, new claim 16 (corresponding to withdrawn claim 8) is slightly different from the withdrawn claim 8 because the term “the upper or lower surface of” has been added. No new matter is added.

Independent claim 1 is the only pending independent claim. Claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Lin (U.S. 6,184,580) in view of Litwin (U.S. 6,507,047). Additionally, claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Seo et al. (U.S. 2005/0062148) in view of Litwin (U.S. 6,507,047). These rejections are traversed.

Claim 1 recites, in pertinent part, “a semiconductor chip including a power semiconductor device constructed by using a wide band gap semiconductor; a base material made of an electrically conductive material and electrically connected to a part of one main face of said semiconductor chip; a heat conducting member coming in contact with a part of the other main face of said semiconductor chip and releasing heat directly from said semiconductor chip without by way of said base material; and an encapsulating material for encapsulating said semiconductor chip and said heat conducting member, wherein a part of said base material is extruded outside said encapsulating material and works as an external connection terminal, and wherein **a first intermediate member made of an electrically conductive material and a**

second intermediate member made of a material having lower heat conductivity than said first intermediate member are provided between said base material and said semiconductor chip.”

As an illustrative example of claim 1, please see FIG. 5A of the present application which displays a chip with semiconductor device 61, a base 62, a first intermediate member 65, and a second intermediate member 68a.

Additionally, please note that the present application, at page 5, line 25 to page 6, line 7, states, “[a]ccordingly, most of heat generated from the semiconductor chip, that is, a source of large heat, is transmitted through the heat conducting member and the vessel to be released to the outside the semiconductor apparatus, and the amount of heat transmitted to the external connection terminal is small. Therefore, connection reliability at the connection between a mother substrate and the external connection terminal is never degraded due to temperature increase, and hence, high reliability can be kept while keeping the power semiconductor device at an appropriately high temperature for attaining high efficiency.”

In order to establish a *prima facie* obviousness under 35 U.S.C. § 103(a), all the claim limitations must be taught or suggested by the prior art. *In re Rokya*, 490 F. 2d 981, 180 USPQ 580 (CCPA 1974). Further, “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F. 3d 977, 988 (Fed. Cir. 2006). At a minimum, the cited prior art does not disclose (expressly or inherently) the above recited limitation.

The Office Action, at pages 2 and 3, asserts that Lin, at FIGS. 3 and 4, discloses all of the elements of claim 1, except the wide band gap semiconductor which is attributed to Litwn.

Further, the Office Action, at page 2, asserts that a base material is disclosed by element 45 of FIG. 3 of Lin. Please note that element 45 of Lin includes parts 26 (first heat sink), 36 (conductive leads), and 35 (substrate), according to Lin at column 3, lines 62-64. Specifically, Lin, at column 3, lines 62-64, states that “[t]he first heat sink 26, the conductive leads 36 and the substrate 35 together serve as a carrier 45 for the silicon chip 20.” Thus, the first heat sink 26 of Lin appears to be a totally distinct part from substrate 35. In other words, element 45 is not a single part, but rather a group of parts. For the purpose of analysis, Applicants will assume that the Office Action intends substrate 35 to disclose the base material of claim 1.

In FIG. 3 of Lin, substrate (or base material) 35 is insulated from the semiconductor chip 20 by molding compound 28.

The Office Action, at page 3, asserts that element 30 (first projection device) of FIG. 3 of Lin discloses the first intermediate member of claim 1, and asserts that element 28 (molding compound) discloses the second intermediate member of claim 1.

However, Lin, at column 5, lines 35-38, states that “[t]he first projection device 30 extends vertically into the molding compound 38 so that the first heat sink 26 and the molding compound 28 are able to adhere tightly with each other.” Therefore, the first projection device 30 has nothing to do with the substrate 35, and is not an intermediate member with respect to the substrate 35. Also, please note that the physical position of substrate 35 in FIG. 3 of Lin is not located between substrate (or base material 35) and semiconductor chip 20.

Thus, first projection device 30 of Lin is **not** “provided between said base material and said semiconductor chip” as required by claim 1. Please see FIG. 5A of the present application wherein element 65 serves as an illustrative example of a first intermediate member provided between base 62 and semiconductor chip 61.

Therefore, Lin does not teach or suggest the claim 1 element, **“a first intermediate member made of an electrically conductive material and a second intermediate member made of a material having lower heat conductivity than said first intermediate member are provided between said base material and said semiconductor chip.”**

Thus, it is clear that Lin, at a minimum, fails to disclose or suggest the foregoing element of claim 1. Furthermore, Litwin neither discloses nor is relied on for disclosing the foregoing elements of claim 1. As such, it is clear that claim 1 is not obvious in view of the combination of Lin and Litwin.

Applicants submit that the other cited art does not remedy the deficiencies of Lin.

Under Federal Circuit guidelines, a dependent claim is allowable if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987).

Accordingly, as independent claim 1 is allowable for the reasons set forth above, it is respectfully submitted that dependent claims 2-6 and 15-19 are also allowable for at least the same reasons.

Accordingly, it is urged that the application, as now amended, is in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, Examiner is requested to call Applicants' attorney at the telephone number shown below.

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To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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